

Distribution System Operator Capabilities to Enable DER Services



Background, Objectives, and New Learnings

The roles and objectives of a Distribution System Operator (DSO) are evolving in local and wholesale markets across the globe. In the U.S., the Federal Energy Regulatory Commission's (FERC) Order 2222 requires independent system operators (ISOs) and regional transmission organizations (RTOs) to allow and enable aggregations of distributed energy resources (DER¹) to provide market services. The European Commission is pursuing similar objectives with the development of a European Network Code on Demand Side Flexibility. In Canada and the United Kingdom, distribution utilities are partnering with wholesale market operators to create new, local distribution markets to balance the changing needs of the grid with the increasing desire to buy and sell locally produced energy.

The designs and functional specifications for a DSO are wide ranging, and might include enabling DER participation in wholesale electricity markets, procuring DER to provide services to the distribution system, or actively managing DER and the distribution system in concert to provide ancillary services to the bulk system operator. In many jurisdictions, utilities are still working towards defining a strategic direction for greater integration of DER that provide services to the grid.

There are many open questions about the roles and responsibilities of a future DSO, as well as the systems, processes, and tools that will be needed to fulfill those roles. There are many significant challenges for distribution utilities

Project Highlights:

- Identify DSO capabilities, processes, tools, and data required to enable DERs to provide services.
- Evaluate gaps to address alignment with FERC Order 2222 objectives or utility specific goals.
- Develop and validate tailored implementation plans for readying DSO systems, processes, and tools.
- Facilitate sharing of developed processes and tools across regions and relevant global implementations.

including: DER modeling, interconnection analysis, power quality, distribution system reliability, operational coordination with market operators and participants, data management and communication, metering and telemetry requirements, and cyber security across systems.

EPRI has a history of working with electric utilities to navigate the challenges of DER integration that spans nearly two decades. This has developed into several methods, frameworks, and tools to help utilities break down broad DER related challenges into manageable and actionable initiatives that meet each company's unique needs.

The objective of this project is to support Distribution entities in enabling DERs to provide services to the grid. EPRI offers a spectrum of services to support utilities in their vision of greater DER integration, including:

- **Strategic Roadmap Development** – Engage with key executives and subject matter experts within a company to develop a detailed strategic roadmap.
- **Coordination Framework Assessment** – Work with internal and external stakeholders to document coordination requirements and assess the framework for achieving common goals.
- **Tactical Implementation Planning** – For priority systems, processes, and tools; identify enhancements and develop actionable plans with language that can be used to solicit proposals.

¹ In FERC Order 2222, DERs including any resource on the distribution system or behind a customer meter, including generation, storage, and load resources.

Benefits

This project may provide the following benefits:

- Establish and communicate participant's vision for a DSO and the pathway toward enabling DER to provide services to the grid.
- Align participant plans with national or regional regulatory objectives.
- Identify gaps in present capabilities, processes, tools, and data required to accommodate greater DER integration and market participation.
- Define the additional capabilities and tools required in their specific situation to reliably integrate higher penetrations of DER and enable active participation in both local and wholesale electricity markets.

Project Approach and Summary

EPRI will apply its methods, frameworks, and tools to help participating utilities accomplish desired objectives related to enabling DER to provide services to the grid. EPRI will work with each participant to develop a tailored scope from among the following options.

Strategic Roadmap

Develop the unique vision and objectives of a DSO tailored to individual participants with regional considerations and requirements. This includes a thorough exploration of the capabilities needed to meet objectives and a structured plan for the transition to meeting identified goals.

Coordination Framework Assessment

Identify the internal and external actors with a stake in the DER integration initiative and their associated roles and responsibilities. Document data ownership, information exchanges, and computations/transformations needed to facilitate the set of processes under review, and synthesize a framework describing coordination activities. Assess gaps and challenges to determine opportunities to enhance or improve coordination.

Tactical Implementation Plan

Prioritize investments based on the needs of each project participant's current state, and develop detailed functional requirements for additional tools and capabilities that are highest priority to implement based on the needs of their unique vision. It will thoroughly examine the dependencies, constraints, standards, and assumptions for identified systems, processes, tools, and interfaces, and identifies technical solutions to address specific challenges.

Deliverables

Each participant will receive a company-specific report documenting the results of the roadmap development, coordination framework assessment, or implementation plan.

The non-proprietary results of this work will be incorporated into applicable EPRI research and development programs.

Price of Project

There are three offerings through this project, each tailored to the specific needs of the participant.

- Strategic roadmap development
- Coordination framework assessment
- Tactical implementation planning

Contact EPRI for tailored scope and pricing.

This supplemental project qualifies for Tailored Collaboration (TC) and Self-Directed Funding (SDF).

Project Status and Schedule

Each project will commence upon finalizing the tailored work scope and schedule. Project duration can vary from 4–6 months for a framework assessment and between 12–18 months for a strategic roadmap or implementation plan.

Who Should Join

Distribution utilities that are in the process of developing DER integration and enablement strategies. Utilities that are interested in making actionable steps towards readiness for DERs providing grid services.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

Technical Contacts

Nick Heine at 865.218.8157 (nheine@epri.com)

Ajit Renjit at 614.620.3154 (arenjit@epri.com)

Ben Ealey at 865.218.5938 (bealey@epri.com)

Member Support Contacts

Brian Dupin at 650.906.2936 (bdupin@epri.com)

Barry Batson at 704.905.2787 (bbatson@epri.com)

Chuck Wentzel at 618.320.0011 (cwentzel@epri.com)

Jimmy Herren at 650.798.7795 (jherren@epri.com)

Warren Frost at 403.474.4432 (wfrost@epri.com)

EPRI

3420 Hillview Avenue, Palo Alto, California 94304-1338 USA

800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com